WM-11D/23

SERVICE MANUAL

- *WM-11D*

US Model

- *WM-23*

AEP Model

E Model

PHOTO: US model

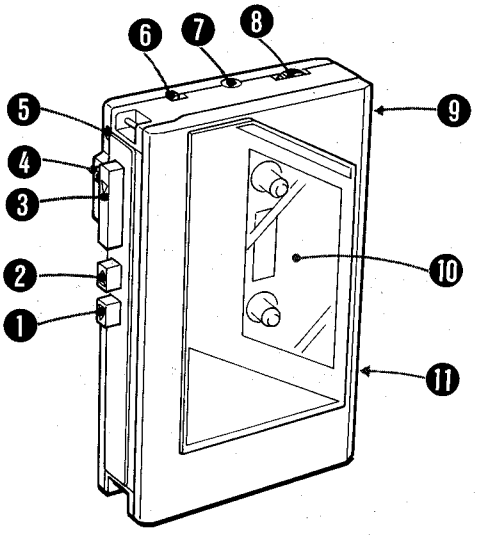
SPECIFICATIONS

Tape track: 4-track 2-channel stereo
Fast winding time: Approx. 2 min. with Sony cassette CHF-60
Frequency response
40–15,000 Hz (with the TAPE selector set to METAL/CrO_2)
40–15,000 Hz (with the TAPE selector set to NORM)
Power output
20 mW + 20 mW (at 10% harmonic distortion) at dc operation
Power requirements: 3 V dc
two size AA batteries (IEC designation R6)
External batteries (used in the optional EBP-500 battery case): two size D batteries, (IEC designation R 20)
DC IN 3 V jack accepts:
optional Sony AC-39 ac power adaptor for use on 120 V ac, 60 Hz,
optional Sony DCC-70 car battery cord for use on 12 V car battery
Battery life (continuous playback hours):
Approx. 3 hours with Eveready No. 1215 Heavy Duty batteries
Approx. 5 hours with Eveready No. E91 Alkaline batteries
For maximum performance we recommend the use of alkaline batteries.
Dimensions: Approx. 132 × 84.7 × 31.4 mm (w/h/d)
($5^1/_4 \times 3^3/_8 \times 1^1/_4$ inches)
not incl. projecting parts and controls
Weight:
Approx. 230 g (8.2 oz) not incl. batteries and other accessories
Approx. 270 g (9.6 oz) incl. batteries, not incl. other accessories

Tape Transport Mechanism Type	MT-WM23-06

PARTS IDENTIFICATION

❶ ◀◀ FF (fast forward) button ❷ ▶▶ REW (rewind) button ❸ ◀ PLAY (playback) button ❹ STOP/EJECT button ❺ Battery indicator ❻ TAPE selector ❼ PHONES (headphones) jack ❽ VOL (volume) control ❾ DC IN 3V (external power input) jack (bottom) ❿ Cassette compartment ⓫ Battery compartment (rear)



MICROFILM

STEREO CASSETTE-PLAYER

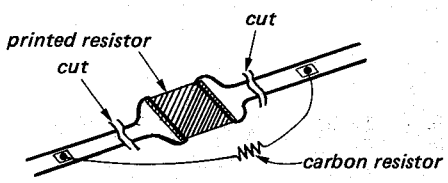
SONY®

TC

–SERVICING NOTE–

Repairing printed resistor

Cut both sides of the resistor and solder the carbon resistor having same value in place of printed one on the conductor side.



Replacing chip components

All chip components should be connected and disconnected, using a tapered soldering iron [temperature of the iron tip: less than 280°C (536°F)], a pair of tweezers and braided wire.

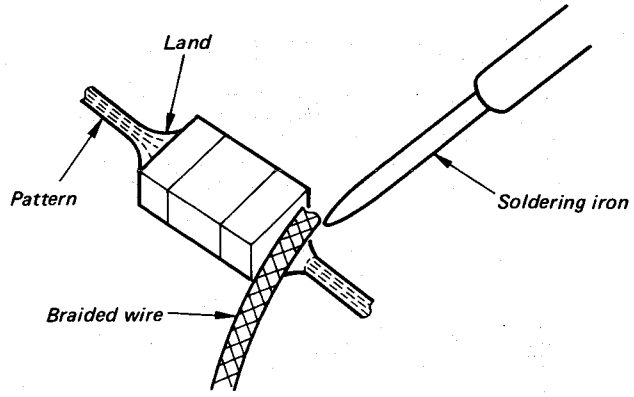
Precautions for replacement

1. **Do not disconnect the chip component forcefully. Otherwise, the pattern may peel off.**
2. **Never re-use a disconnected chip component. Dispose of all old chip components.**
3. **To protect the chip component, heating time for attaching the component should be within 3 seconds.**

○ **Removing chip components**

(1) **Removing solder at electrode**

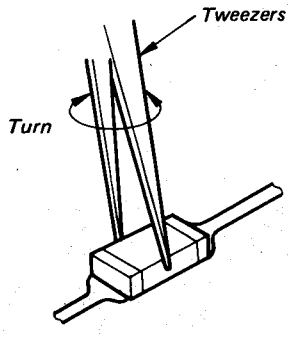
Remove the solder at the electrode, using a thin braided wire. Do not remove the solder of the part (chip component) attached adjacent to the electrode.



(2) **Disconnecting chip components**

Turn the tweezers with the soldering iron alternately applied to both electrodes, and the chip component will be disconnected. Take careful precautions while disconnecting, because if the chip component is forcefully removed the land may peel off.

Never re-use a disconnected chip component.



(3) **Smoothing the soldered surface**

After disconnecting the chip component, remove the solder by using a braided wire to smooth the land surface.

○ **Connecting chip components**

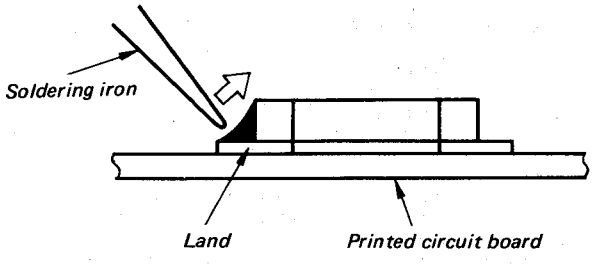
The value of chip components is not displayed on the main body. Take due precautions to avoid mixing new chip components with other ones.

(1) **Applying solder to land on one side**

Apply a thin layer of solder to the land on one side where the chip component is to be connected. Too much solder may cause bridging.

(2) **Speedy soldering**

Hold the chip component at the desired position, using tweezers, and apply the soldering iron in the arrow-marked direction. To protect the chip component, heating time should be within 3 seconds.

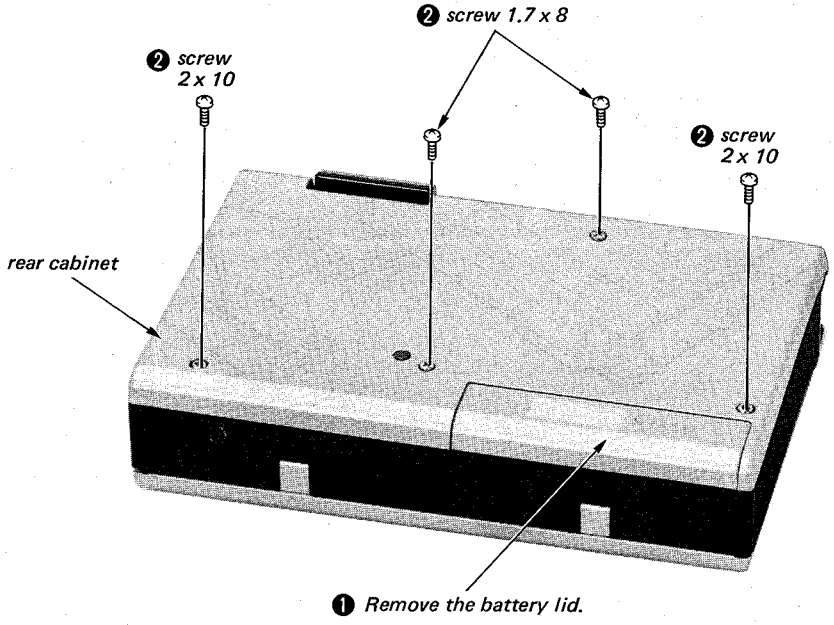


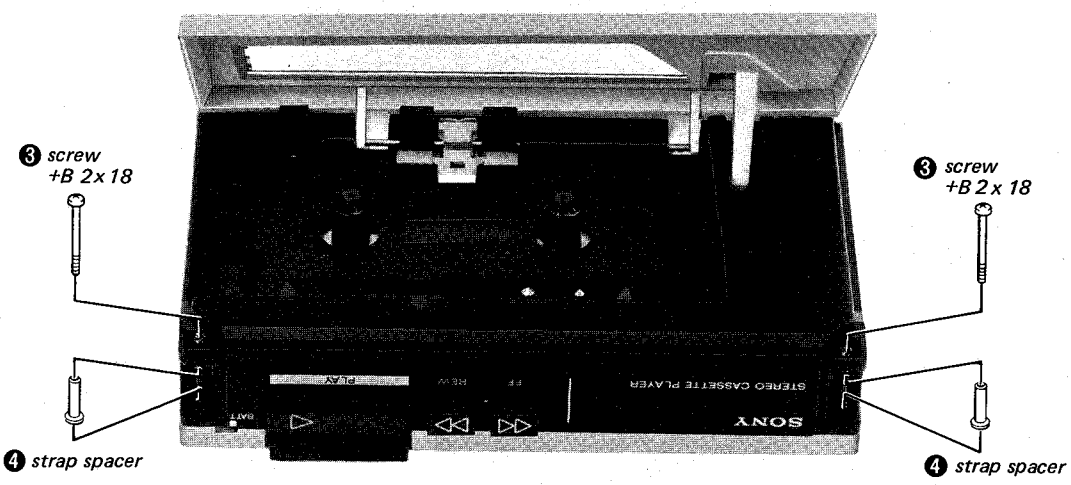
(3) **Speedy soldering of electrode on the other side**

Solder the electrode on the other side in the same way as in (2) above.

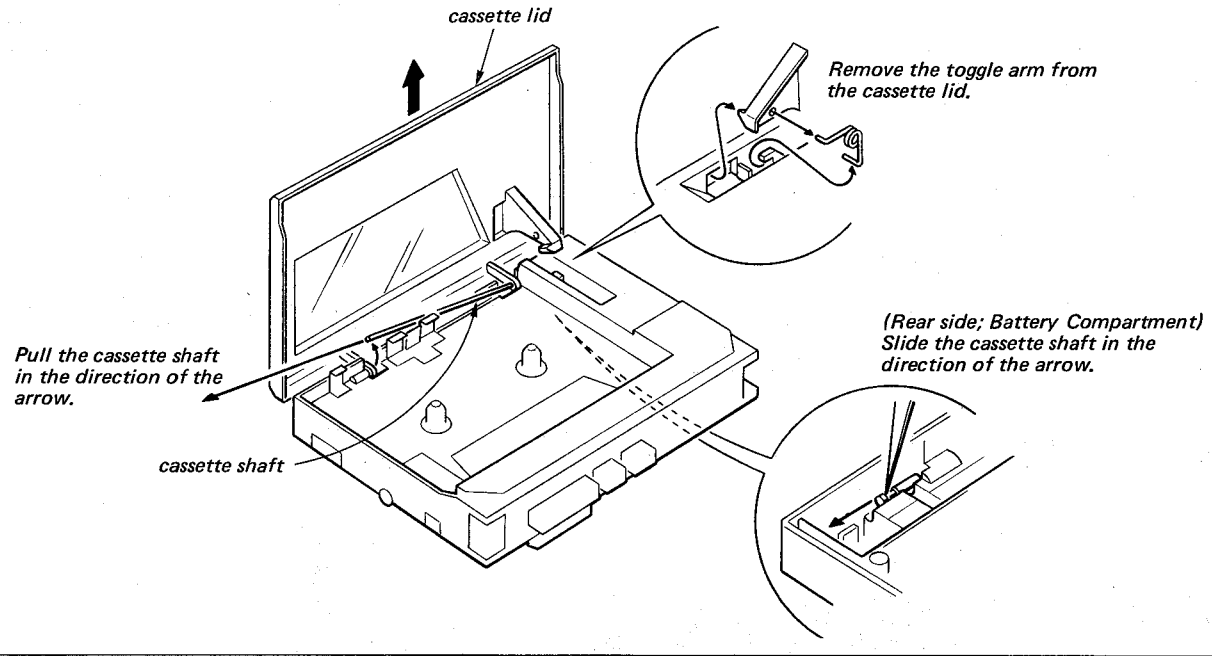
SECTION 1
DISASSEMBLY

REAR CABINET REMOVAL

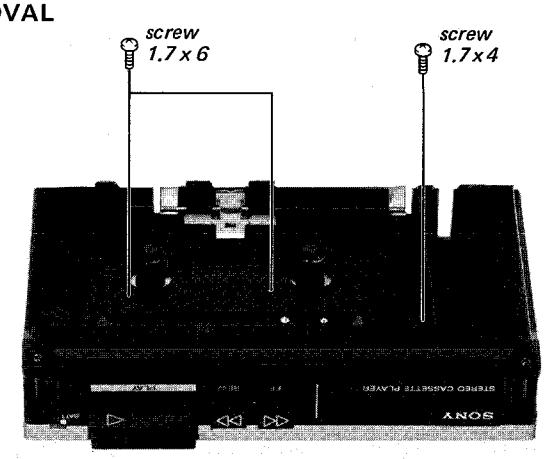




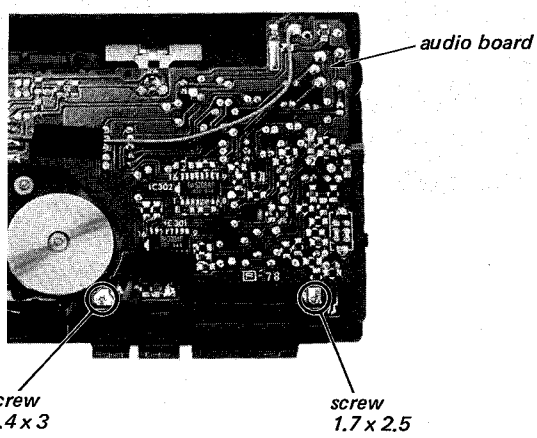
CASSETTE LID REMOVAL


cassette lid
Remove the toggle arm from the cassette lid.
Pull the cassette shaft in the direction of the arrow.
(Rear side; Battery Compartment) Slide the cassette shaft in the direction of the arrow.
cassette shaft

MECHANISM BLOCK REMOVAL



AUDIO BOARD REMOVAL



SECTION 2
ADJUSTMENTS

2-1. MECHANICAL ADJUSTMENTS AND MEASUREMENT

PRECAUTION

1. Clean the following parts with a denatured-alcohol-moistened swab:
   - playback head
   - pinch roller
   - rubber belts
   - capstan
   - idlers
2. Demagnetize the playback head with a head demagnetizer.
3. Do not use a magnetized screwdriver for the adjustments.
4. After the adjustments, apply suitable locking compound to the parts adjusted.
5. The adjustments should be performed with the rated power supply voltage unless otherwise noted.

power supply voltage : 3 V dc
SPEED CONTROL knob : center click

Torque Measurement

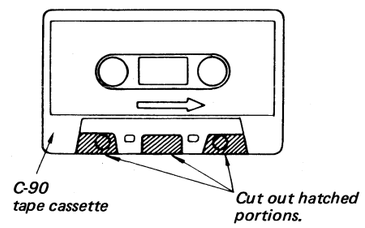
Torque	Meter reading	Torque meter
Forward	22 – 52 g•cm (0.3 – 0.72 oz•inch)	CQ-102B
Fast Forward and Rewind	50 – 75 g•cm (0.69 – 1.0 oz•inch)	CQ-201B
Back Tension	1.5 – 4.5 g•cm (0.02 – 0.06 oz•inch)	CQ-102B

Tape Tension Measurement

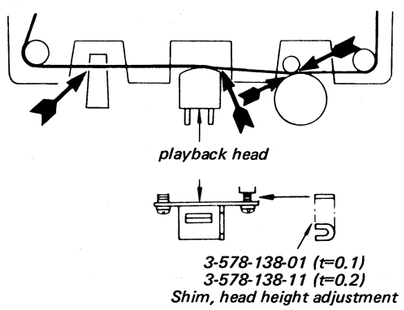
Meter	Meter Reading
CQ-403	More than 110 g (3.88 oz)

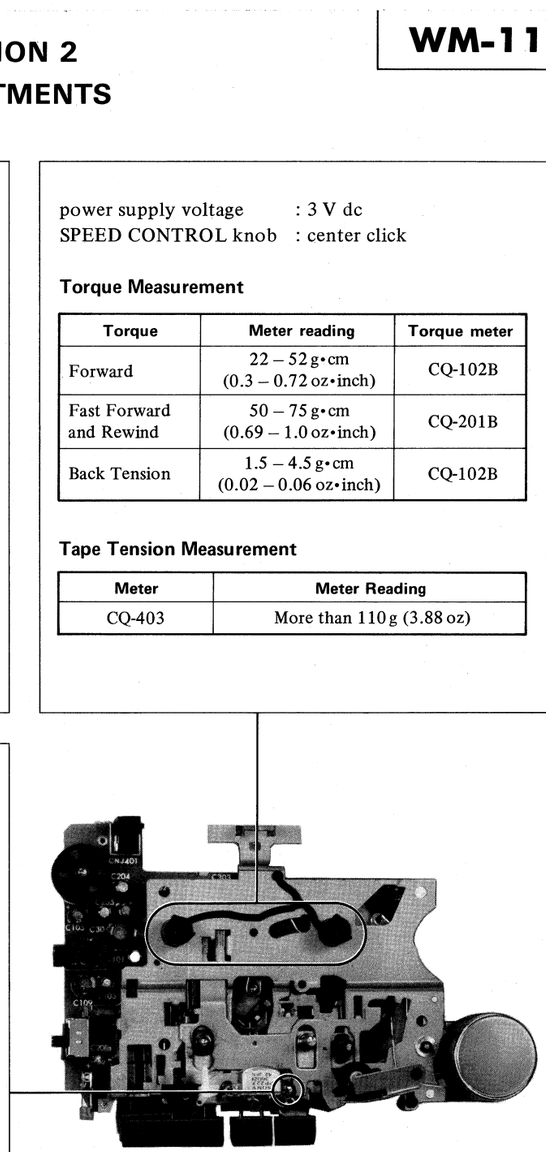
Head Height Adjustment

1. Prepare an adjustment cassette as shown below.



2. In record mode and viewing from the front, adjust the head heights to eliminate tape curl and tape twist at arrowed portions.



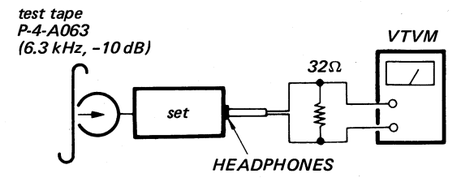


2-2. ELECTRICAL ADJUSTMENTS

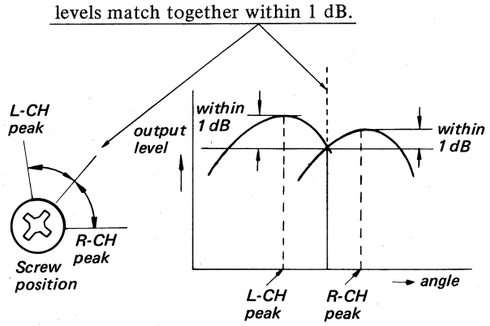
Playback Head Azimuth Adjustment

Procedure:

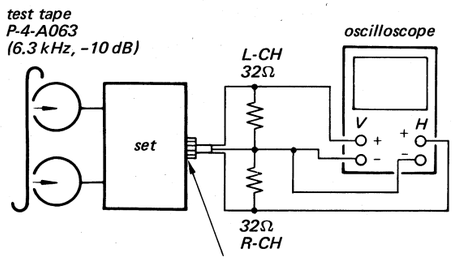
1. Mode: playback

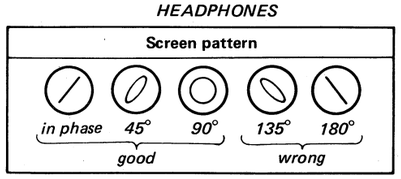


2. Turn the adjustment screw for the maximum output levels. If these levels do not match, turn the adjustment screw where both of output levels match together within 1 dB.



3. Phase Check
   Mode: playback



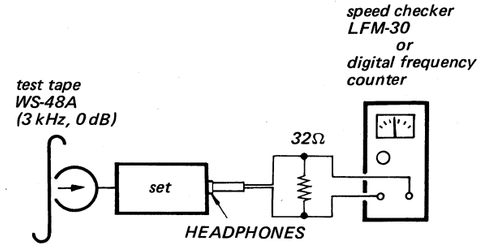


4. After the adjustment, lock the screws with locking compound.

Tape Speed Adjustment

Procedure:

Mode: playback

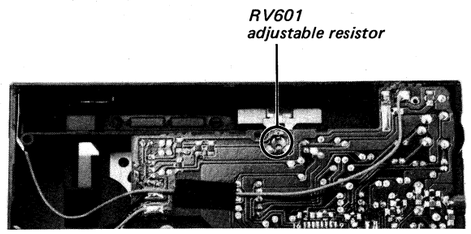


Specification:

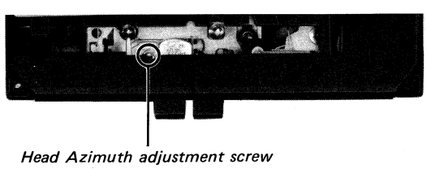
Speed checker	Digital frequency counter
±0.5%	2,985 – 3,015 Hz

Frequency difference between the beginning and the end of the tape should be within 1% (30 Hz).

Adjustment Location:



Adjustment Location:



SECTION 3 DIAGRAMS

3-1. MOUNTING DIAGRAM

【AUD BOARD】

IC	D
301	301
302	
601	

(CHASSIS)

BATT D301

S301 TAPE NORM METAL CrO2

J301 PHONES OUTPUT

RV301 VOLUME

S302 POWER

IC301 IC302 IC601

HP901 PB HEAD — WHT RED ((GRY)) INPUT

M901 MOTOR — RED ⊕ BLK ⊖

RV601 SPEED ADJ

(GROUNDED WITH SHIELD SHEET)

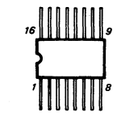
DRY BATTERY SIZE "AA" (IEC DESIGNATION R6) 2PCS.3V

CN301 DC IN 3V

TOTAL CURRENT — PLAY:145mA REW :140mA FF :130mA

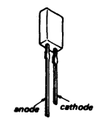
● Semiconductor Lead Layouts

BA3304F BA5208AF



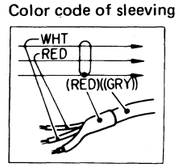
LA5523

GL-9PR22



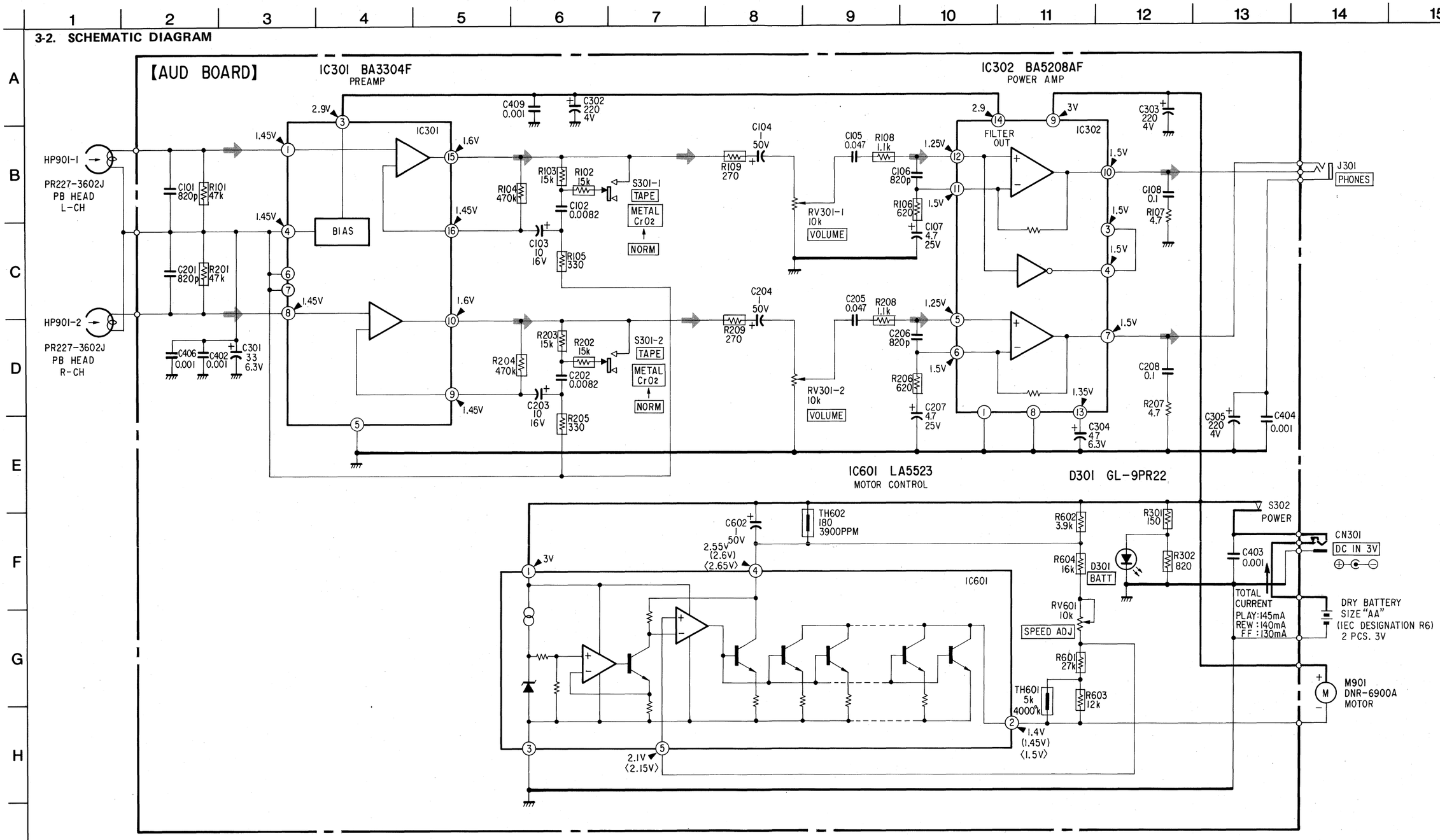
Note:

- Color code of sleeving over the end of the jacket.



- ○— : parts extracted from the component side.
- ●— : parts extracted from the conductor side.
- ▨ : Printed resistor
- ▬▶▬ : signal path
- ▬▶ : L-CH signal path
- ▬·▬▶ : R-CH signal path
- ▒ : B+ pattern
- ▒ : component-side pattern. (Printed Jumper)

3-2. SCHEMATIC DIAGRAM



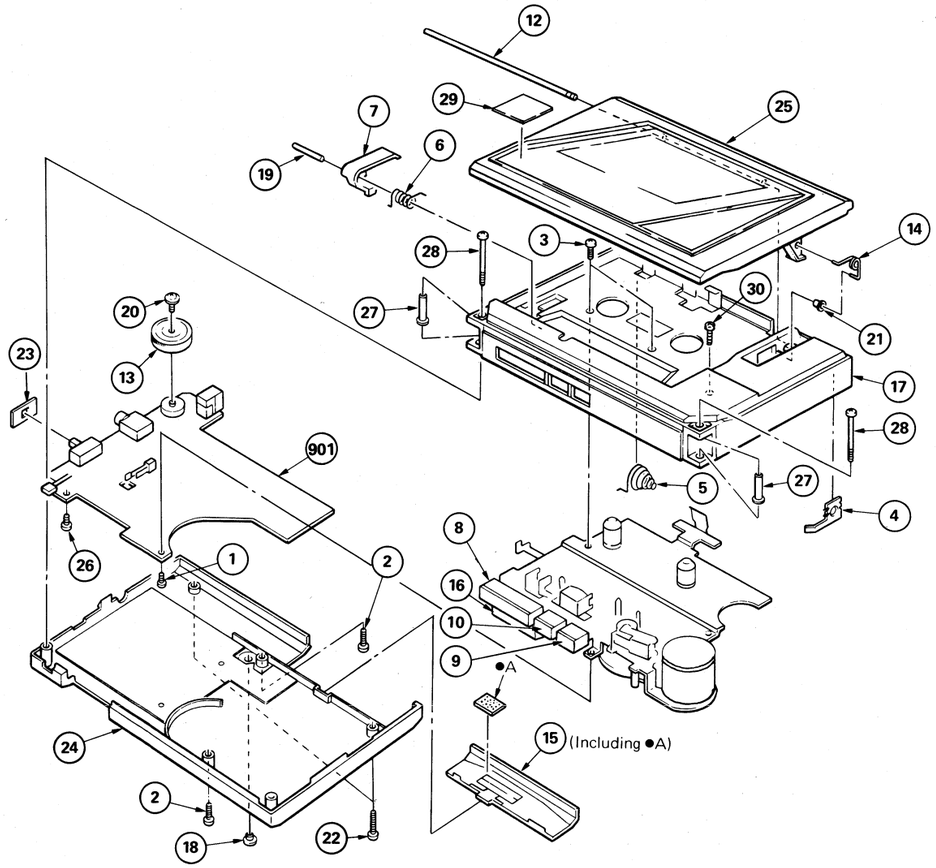
Note:

- All capacitors are in μF unless otherwise noted. pF: μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4W or less unless otherwise specified.
- ➡ : signal path.
- ⊣▭⊢ : Printed resistor
- ——— : B+ bus.
- Power voltage is 3 V and fed with DC IN 3 V jack from voltage regulator.
  Voltages are dc with respect to ground in stop mode.
  Voltage variations may be noted due to normal production tolerances.
  no mark: PLAY
  ( ) : REW
  < > : FF

SECTION 4
EXPLODED VIEWS AND PARTS LIST

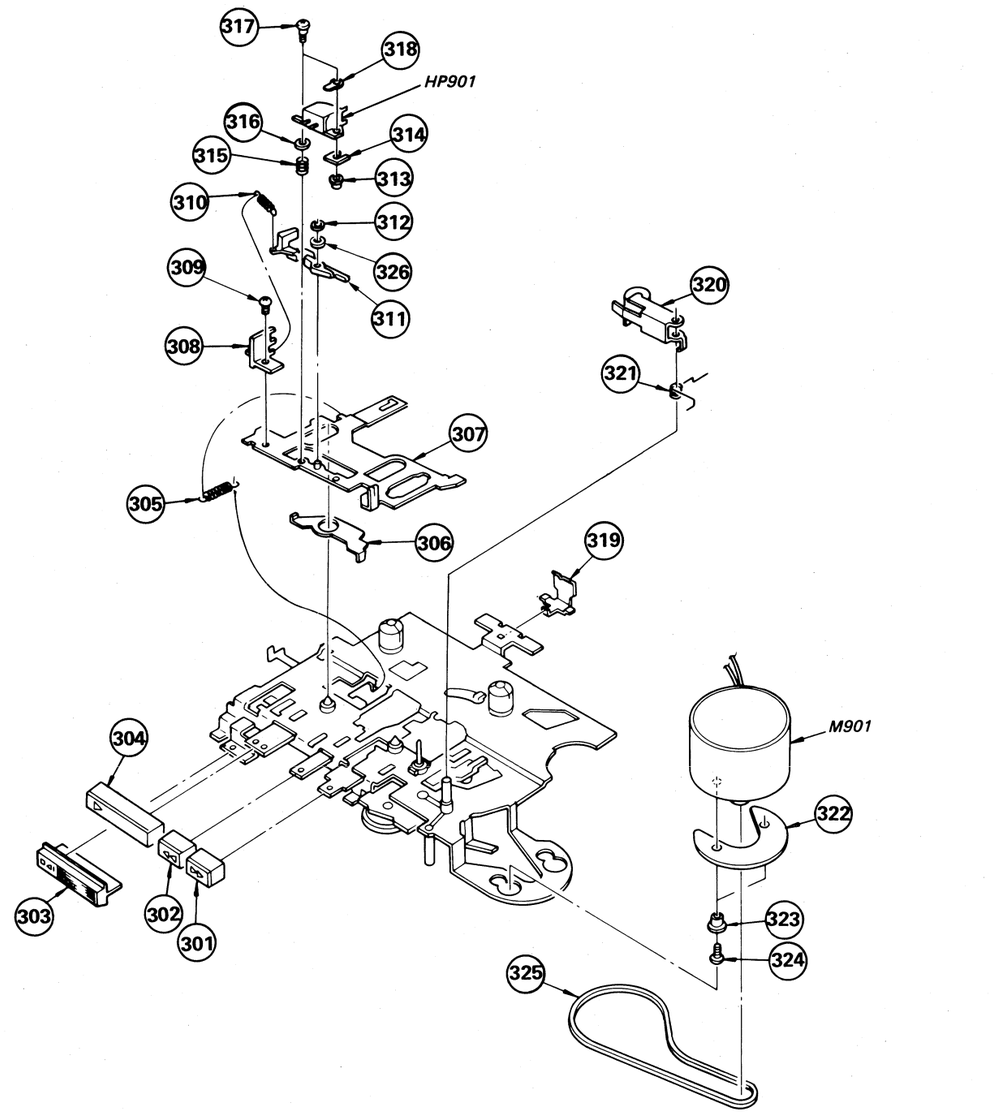
NOTE:
- The mechanical parts with no reference number in the exploded views are not supplied.
- Items marked " ★ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The construction parts of an assembled part are indicated with a collation number in the remark column.

(1)



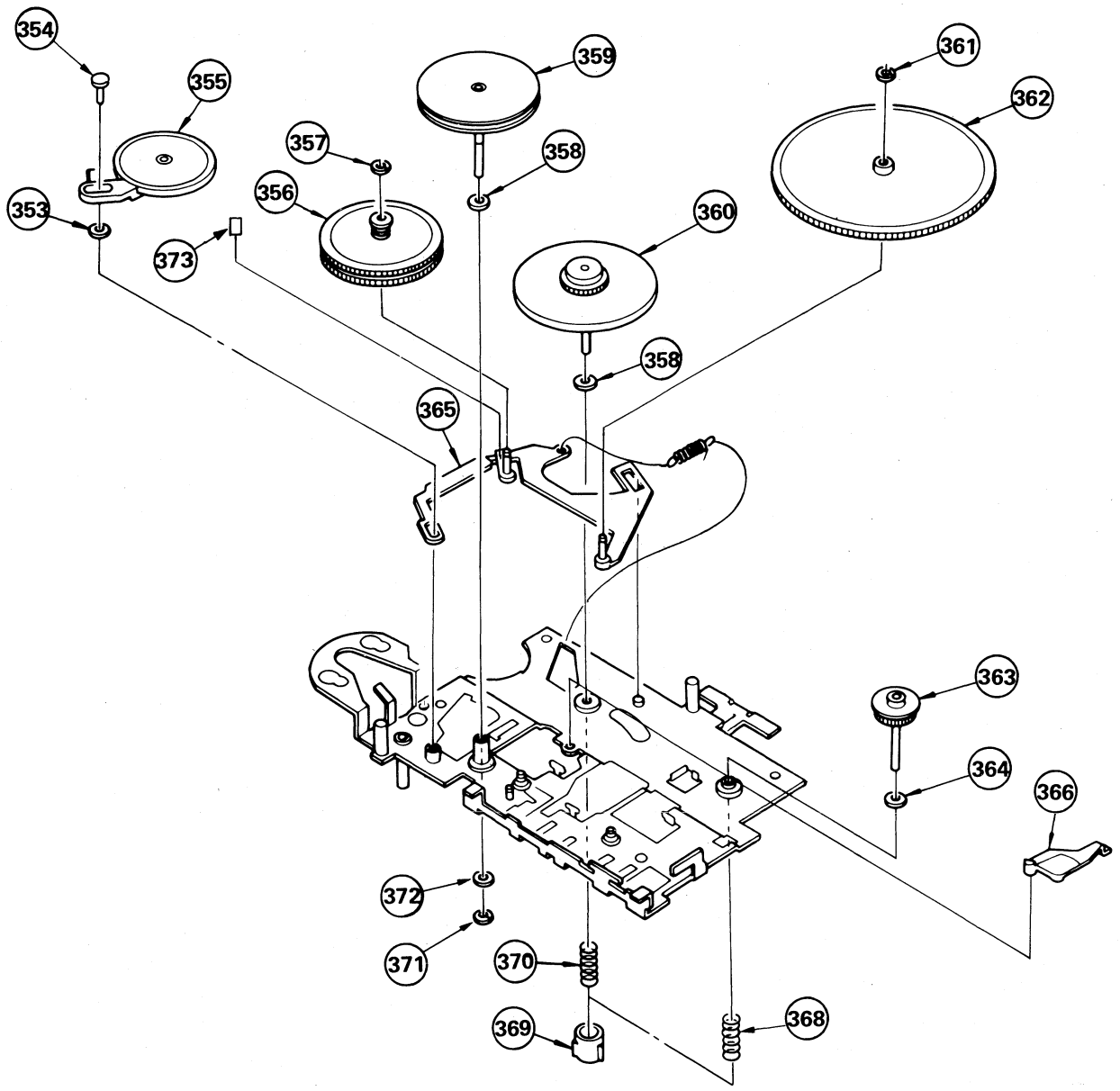
No.	Part No.	Description	REMARKS
1	3-318-202-01	SCREW (1.4X3), TAPPING	
2	3-318-203-21	SCREW (1.7X8), TAPPING	
3	3-318-204-31	SCREW (M1.7X6), TAPPING	
4	3-318-209-01	TERMINAL BOARD, PLUS	
5	3-318-210-01	SPRING	
6	3-318-215-01	SPRING	
7	3-321-022-01	LEVER, EJECT	
8	3-319-013-01	BUTTON, PLAY	
9	3-319-014-01	BUTTON, FF	
10	3-319-015-01	BUTTON, REW	
11	3-320-907-01	SCREW (+P2X201ZZ), TAPPING	
12	3-320-901-01	SHAFT, CASSETTE	
13	3-321-001-01	KNOB, CONTROL	
14	3-321-002-01	SPRING	
15	X-3321-014-1	(AEP,E;RED)...LID, BATTERY CASE	
15	X-3321-014-2	(AEP,E;BLUE)..LID, BATTERY CASE	
15	X-3321-014-5	(US).....LID, BATTERY CASE	
15	X-3321-014-4	(AEP,E;WHITE).LID, BATTERY CASE	
16	3-321-006-01	BUTTON, STOP	
17	3-321-076-01	CABINET (FRONT)	
18	3-545-657-21	BUSH	
19	3-703-357-06	PIN, PARALLEL (DIA. 1.6X14)	
20	3-703-502-41	SCREW	
21	7-623-612-01	EYELET, 1.5X4	
22	7-685-106-14	SCREW +P 2X10 TYPE2 NON-SLIT	
23	9-911-863-XX	PLATE, BLIND	
24	X-3321-055-1	(US).....CABINET (REAR) ASSY	
24	X-3321-011-3	(AEP,E;RED)....CABINET (REAR) ASSY	
24	X-3321-012-3	(AEP,E;BLUE)...CABINET (REAR) ASSY	
24	X-3321-013-3	(AEP,E;WHITE)..CABINET (REAR) ASSY	
25	X-3321-051-1	(US)....LID ASSY, CASSETTE	
25	X-3327-303-1	(AEP,E;RED).....LID ASSY, CASSETTE	
25	X-3327-302-1	(AEP,E;BLUE)....LID ASSY, CASSETTE	
25	X-3327-301-1	(AEP,E;WHITE)...LID ASSY, CASSETTE	
26	3-321-041-01	SCREW +PWH 1.7X3.5	
27	3-320-918-01	SPACER, STRAP	
28	3-320-919-01	SCREW +B 2X18	
29	3-703-708-01	STICKER, SONY SYMBOL	
30	3-318-204-91	SCREW (M1.7X4), TAPPING	
901	*A-3070-129-A	MOUNTED PCB, AU	

(2)



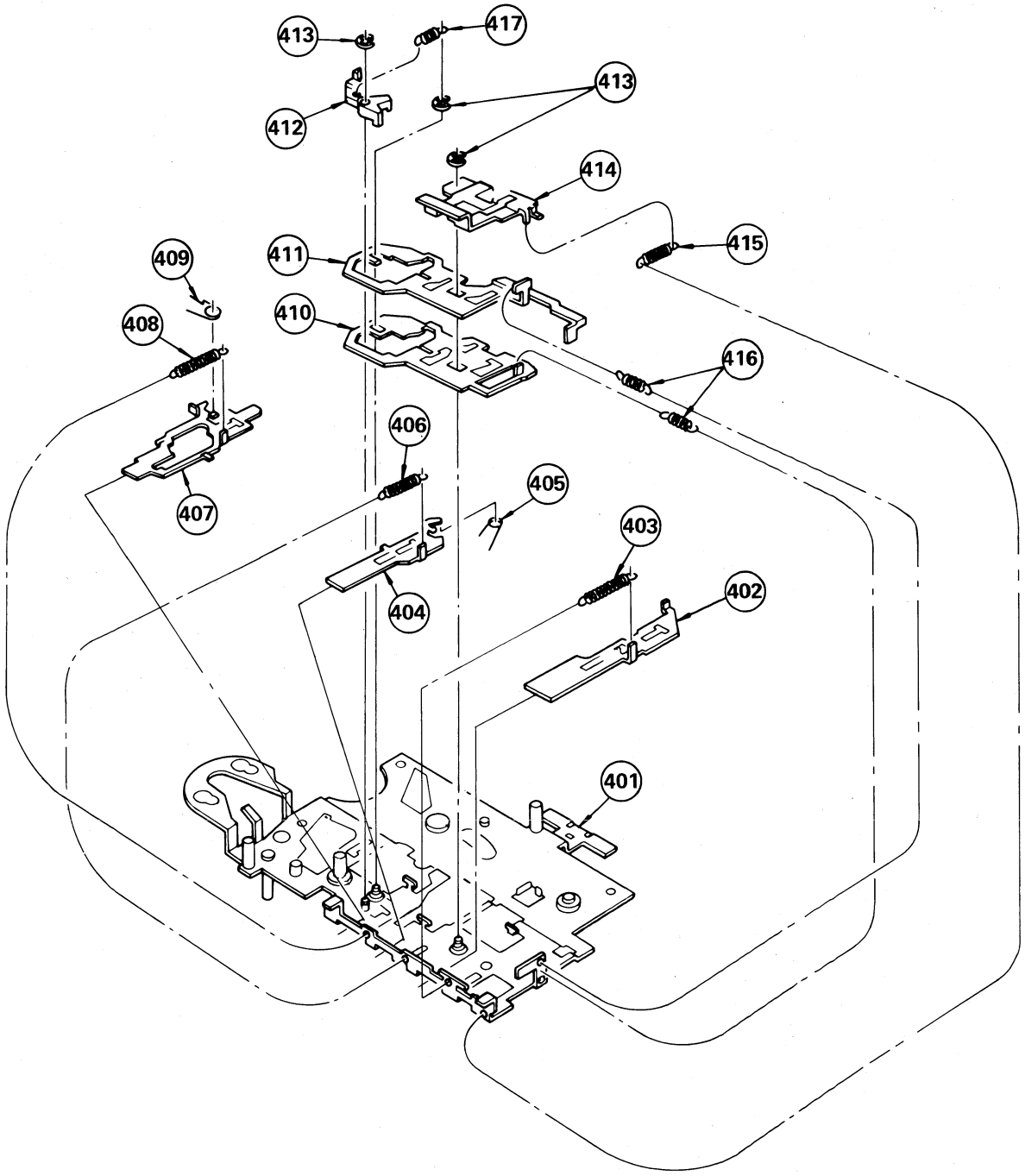
No.	Part No.	Description	REMARKS
301	3-319-014-11	BUTTON, FF	
302	3-319-015-11	BUTTON, REW	
303	3-321-006-01	BUTTON, STOP	
304	3-319-013-11	BUTTON, PLAY	
305	3-565-927-00	SPRING, TENSION	
306	*3-318-267-01	LEVER, CR	
307	X-3318-222-1	CHASSIS ASSY, HEAD	
308	3-318-287-01	GUIDE, TAPE	
309	7-627-552-07	SCREW, PRECISION +P 1.7X2.5	
310	3-318-238-01	SPRING, TENSION	
311	3-318-252-01	ARM, DETECTION	
312	3-570-615-00	POLY-WASHER (DIA.1.2)	
313	3-318-309-01	SPACER, HEAD	
314	3-578-138-01	SEAM (t=0.1)	
	3-578-138-11	SEAM (t=0.2)	
315	3-318-237-01	SPRING, COMPRESSION	
316	7-688-001-01	W 2, SMALL	
317	3-318-240-01	SCREW (1.4), SPECIAL	
318	7-623-505-01	LUG, 2	
319	3-318-269-01	SPRING	
320	A-3110-010-A	PINCH LEVER ASSY	
321	3-318-275-01	SPRING	
322	3-318-254-01	CUSHION, MOTOR	
323	*3-318-310-01	COLLAR, MOTOR	
324	7-627-552-67	SCREW, PRECISION +P 1.7X4.5	
325	3-318-242-00	BELT	
326	3-308-472-21	WASHER (C)(t=0.075)	
	3-308-472-31	WASHER (C)(t=0.125)	

(3)



No.	Part No.	Description	REMARKS
353	3-827-323-11	WASHER (DIA. 3.1)	
354	3-318-324-01	BUSHING, IDLER LEVER	
355	X-3318-210-1	LEVER ASSY, FWD IDLER	
356	X-3318-207-1	GEAR (A) ASSY, FR	
357	3-578-265-11	WASHER, STOPPER	
358	3-701-437-11	WASHER (t=0.25)	
359	X-3318-211-1	FLYWHEEL ASSY	
360	X-3318-202-1	CLUTCH ASSY	
361	3-570-615-00	POLY-WASHER (DIA.1.2)	
362	3-318-265-01	GEAR (B), FR	
363	X-3318-204-1	GEAR ASSY, REW	
366	3-318-288-01	ARM, FF	
364	3-701-437-21	WASHER (t=0.5)	
365	X-3318-208-1	LEVER ASSY, FR	
367	3-318-243-01	SPRING, TENSION	
368	3-321-024-01	SPRING, COMPRESSION	
369	3-306-836-02	CAP, REEL, T	
370	3-318-241-01	SPRING, COMPRESSION	
371	3-318-236-01	WASHER, POLY, SLIT	
372	3-701-437-01	WASHER (t=0.13)	
373	3-831-441-XX	CUSHION	

(4)



No.	Part No.	Description	REMARKS
401	X-3327-304-1	CHASSIS ASSY, MECHANICAL	
402	*3-318-290-01	LEVER, PLAY	
403	3-318-246-01	SPRING, TENSION	
404	3-318-292-04	LEVER, REW	
405	3-318-277-01	SPRING, REW	
406	3-318-251-01	SPRING, TENSION	
407	3-318-291-01	LEVER, FR	
408	3-318-250-01	SPRING, TENSION	
409	3-318-276-01	SPRING	
410	3-321-007-01	PLATE, LOCK	
411	3-318-300-01	LEVER, SWITCH	
412	3-318-296-01	LEVER, SHUT-OFF	
413	7-624-101-01	RING, RETAINING E-1.2	
414	*3-318-293-01	LEVER, STOP	
415	3-547-669-00	SPRING, TENSION	
416	3-318-248-01	SPRING, TENSION	
417	3-318-351-01	SPRING, TENSION	

SECTION 5
ELECTRICAL PARTS LIST

NOTE:
- Items marked " ★ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- If there are two or more same circuitsin a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

CAPACITORS:
MF:μF, PF:μμF.

RESISTORS
- All resistors are in ohms.
- F : nonflammable

COILS
- MMH : mH, UH : μH

SEMICONDUCTORS
In each case, U : μ, for example:
UA...: μA..., UPA...: μPA..., UPC...: μPC, UPD...: μPD...

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
901	*A-3070-129-A	MOUNTED PCB, AU			
C101	1-163-203-00	CERAMIC CHIP	820PF	10%	50V
C102	1-163-058-00	CERAMIC CHIP	0.0082MF	10%	50V
C103	1-123-617-00	ELECT	10MF	20%	16V
C104	1-123-611-00	ELECT	1MF	20%	50V
C105	1-161-059-00	CERAMIC	0.047MF	10%	25V
C106	1-163-203-00	CERAMIC CHIP	820PF	10%	50V
C107	1-123-616-00	ELECT	4.7MF	20%	25V
C108	1-163-077-00	CERAMIC CHIP	0.1MF		50V
C201	1-163-203-00	CERAMIC CHIP	820PF	10%	50V
C202	1-163-058-00	CERAMIC CHIP	0.0082MF	10%	50V
C203	1-123-617-00	ELECT	10MF	20%	16V
C204	1-123-611-00	ELECT	1MF	20%	50V
C205	1-161-059-00	CERAMIC	0.047MF	10%	25V
C206	1-163-203-00	CERAMIC CHIP	820PF	10%	50V
C207	1-123-616-00	ELECT	4.7MF	20%	25V
C208	1-163-077-00	CERAMIC CHIP	0.1MF		50V
C301	1-123-646-00	ELECT	33MF	20%	6.3V
C302	1-123-827-00	ELECT	220MF	20%	4V
C303	1-123-827-00	ELECT	220MF	20%	4V
C304	1-123-647-00	ELECT	47MF	20%	6.3V
C305	1-123-827-00	ELECT	220MF	20%	4V
C402	1-163-047-00	CERAMIC CHIP	0.001MF	10%	50V
C403	1-163-047-00	CERAMIC CHIP	0.001MF	10%	50V
C404	1-163-047-00	CERAMIC CHIP	0.001MF	10%	50V
C406	1-163-047-00	CERAMIC CHIP	0.001MF	10%	50V
C409	1-163-047-00	CERAMIC CHIP	0.001MF	10%	50V
C602	1-123-611-00	ELECT	1MF	20%	50V
CN301	1-507-723-00	JACK, EXTENTION POWER (DC IN 3V)			
D301	8-719-919-23	DIODE GL-9PR22			
HP901	8-825-507-01	HEAD (PP227-3602J)			
IC301	8-759-910-18	IC BA3304F			
IC302	8-759-910-71	IC BA5208AF			
IC601	8-759-801-12	IC LA5523			
J301	1-507-917-00	JACK, STEREO (PHONES)			
M901	8-835-105-01	MOTOR, DC (DNR-6900A)			

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R101	1-247-871-00	CARBON	47K	5%	1/6W
R102	1-247-859-00	CARBON	15K	5%	1/6W
R103	1-247-859-00	CARBON	15K	5%	1/6W
R104	1-247-895-00	CARBON	470K	5%	1/6W
R105	1-247-819-00	CARBON	330	5%	1/6W
R106	1-247-826-00	CARBON	620	5%	1/6W
R107	1-247-775-00	CARBON	4.7	5%	1/6W
R108	1-247-832-00	CARBON	1.1K	5%	1/6W
R109	1-247-817-00	CARBON	270	5%	1/6W
R201	1-247-871-00	CARBON	47K	5%	1/6W
R202	1-247-859-00	CARBON	15K	5%	1/6W
R203	1-247-859-00	CARBON	15K	5%	1/6W
R204	1-247-895-00	CARBON	470K	5%	1/6W
R205	1-247-819-00	CARBON	330	5%	1/6W
R206	1-247-826-00	CARBON	620	5%	1/6W
R207	1-247-775-00	CARBON	4.7	5%	1/6W
R208	1-247-832-00	CARBON	1.1K	5%	1/6W
R209	1-247-817-00	CARBON	270	5%	1/6W
R301	1-247-811-00	CARBON	150	5%	1/6W
R302	1-247-829-00	CARBON	820	5%	1/6W
R601	1-247-865-00	CARBON	27K	5%	1/6W
R602	1-247-845-00	CARBON	3.9K	5%	1/6W
R603	1-247-857-00	CARBON	12K	5%	1/6W
R604	1-247-860-00	CARBON	16K	5%	1/6W
RV301	1-230-485-11	RES, VAR, CARBON 10K/10K			
RV601	1-230-503-11	RES, ADJ, CARBON 10K			
S301	1-554-123-00	SWITCH, SLIDE (TAPE)			
S302	1-554-297-00	SWITCH, LEAF (POWER)			
TH601	1-800-279-21	THERMISTOR			
TH602	1-806-881-11	THERMISTOR (POSITIVE)			

ACCESSORY & PACKING MATERIAL

No.	Part No.	Description
	*3-321-013-01	CUSHION, 4 GANG
	*3-321-015-01	SPACER
	3-321-020-01	BELT, SHOLDER
	3-321-058-01	LABEL, SERIAL NUMBER
	3-321-080-01	(US).....INDIVIDUAL CARTON
	3-327-302-01	(AEP,E)...INDIVIDUAL CARTON
	3-527-213-00	LABEL, SERIAL NUMBER
	3-570-631-81	BAG, POLYETHYLENE
	3-703-923-01	(WHITE)...LABEL, COLOR
	3-703-920-01	(RED).....LABEL, COLOR
	3-703-916-01	(BLUE)....LABEL, COLOR
	3-760-599-21	(US).....MANUAL, INSTRUCTION
	3-760-599-11	(E,AEP)...MANUAL, INSTRUCTION
	3-760-599-41	(AEP).....MANUAL, INSTRUCTION
	3-795-748-21	(US)....SAFETY INSTRUCTION, HEADPHONE
	8-952-217-91	HEADPHONE MDR-02L (K), SET

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